Sustainable NFT's

Gitcoin Virtual Hackathon
GREEN NFT HACKATHON

1. Introduction

The shine and complexity of NFT, crypto and blockchain technology in general is so much that we cannot expect a general user to understand what happens behind the scenes. According to research, people tend to watch more video content than to adopt a reading method, yet all the deep insights are written in documentations. The need to make people aware about the aspects of NFT through video streaming platforms is essential as it can help the community awaken. People generally tend to ignore the problem unless it's alarming. As the number of users are still handful, the current NFT marketplaces can be seen as a pilot, but as the size of community is growing rapidly, we need to watch our carbon footprints closely.

2. Artists

We are grateful for NFT tokens as they are motivating artists to follow their passion. As an artist myself, pursuing music or painting as a career was not a sustainable option. Though the entertainment industry is booming, small artists really struggle to make a living. I've seen some of my close friends pursuing their dreams and passions while some do it for satisfaction in their free time. I try to help my fellow dreamers in any way I can. Recently, I've taken on an NFT Gallery Project to help such small artists. These people have the ability to shake the world with imagination and truth at the same time. While researching I was fascinated by the world of Cryptocurrency. I've been following this new technology, when I stumbled across the negative Environmental Impacts of NFT.

3. Why NFT

Attaching art to a token (NFT) has several benefits: most importantly it creates a record of provenance. A token can be compared to a certificate of authenticity as it is cryptographically signed by the artist. Upon creation, ownership and trade history can be

tracked on a publicly verifiable ledger (blockchain). This helps combat issues like plagiarism and can be used to verify copyright of images. Tokenization also permits the art to be efficiently and securely traded. Secondary market royalties allow the original artist to be rewarded on subsequent sales which is a huge revolution in the art industry.

4. How bad are NFTs?

Most people are minting NFT on Ethereum block chain, using platforms like OpenSea, Rarible, Mintable, and many more. Although NFT's have remarkably helped artists, it hurts mother nature in a serious manner.

Bitcoin, Ethereum and many other crypto currencies work on the Proof-of-Work (POW) consensus algorithm. This helps in storing the data in a distributed, decentralised fashion across multiple nodes in a network, without hampering security and reliability. But on the other hand it consumes a lot of energy in solving the complex puzzle to mine a block using this consensus method. Just to get an idea of how escalated the situation is I am taking some notes from a famous Blog post by Memo Akten on medium.com.

- A single **email** has a footprint of a **few grams** of CO_2.
- one hour of **Netflix** has a footprint of **36gms** of CO_2.
- single **ETH(Ethereum)** transaction has a footprint on average of **35KWh (20 $KgCO_2$)**

However transactions involving **NFT** are more complex and worse.

- The footprint of a single transaction relating to a NFT on **SuperRare** averaged across all **80000** transactions (including minting, bidding, sales, transfers etc) is **82 KWh**, with emissions of **48 $KgCO_2$**.

Breakup of average footprint related to actions on an NFT.

- **Minting**: 142 kWh, 83 KgCO2
- **Bids**: 41 kWh, 24 KgCO2
- **Cancel Bid**: 12 kWh, 7 KgCO2
- **Sale**: 87 kWh, 51 KgCO2
- **Transfer of ownership**: 52 kWh, 30 $KgCO_2$.

5. Solutions

As we have seen Bitcoin and ethereum mining, which is based on the Proof of Work (PoW) Consensus algorithm, miners solve a complex puzzle and compete with other miners for the same reward and publish a new block in the corresponding network block-chain. For solving this complex puzzle, miners require a lot of energy resources, which can be checked again in the above section.

5.1 Proof of Stake

Unlike PoW, where miners require a lot of energy resources to publish a new block, Scott Nadal and Sunny King created Proof of Stake consensus algorithm in 2012 stating that Bitcoin and its PoW method require an equivalent of $150,000 in daily electricity cost.
Instead of spending electricity, validators have to store some of their coin assets into the network vault as a security. On completion of publishing a new block, validators get a reward for their service. On the other hand if validators try to outsmart and cheat, their assets will vanish.

This came out to be a more sustainable method by a large factor and a lot of new cryptocurrency networks are based on this algorithm.
The first cryptocurrency to adopt this method was peercoin, soon followed by blackcoin and ShadowCoin.

Shifting the paradigm of minting NFT on PoS networks rather than on PoW networks can help sustain our environment. Additionally Etherum has planned to move on PoS soon according to their roadmap, and seeing such advancements may help other technologies take better decisions.
Check out Etherum's idea of PoS here.
Celo and Harmony are relatively some of the new cryptocurrencies that are based on PoS, which I followed recently.
As far as I know, some developers are working in this domain to create a NFT marketplace DApp using celo Sdk.

5.2 Layer2

It is the set of technologies which run on top of the layer1 Architecture, inheriting security properties from layer1 and providing greater transaction speed, less transaction fees(Gas), and increasing scalability by greater transaction processing capacity(throughput).
This enables blockchain apps to handle many more users and transactions than underlying layer1.
Mostly L2 solutions revolve around a network of servers, each of which are referred to as a node, validator, operator, block producer, sequencer, etc. Transactions are submitted to these L2 nodes instead of directly writing them to L1. The L2 instances then batch these transactions into groups before sending them to L1 for final addition of blocks in the chain, which cannot be altered, hence adhering to fundamental protocols.
This will majorly help in reducing the carbon emission in ETH platform, and can also be seen as a near future solution for sustainable environment and cryptocurrencies.

Polygon is already being used in minting super low Carbon NFTs by Tokenized Tweets.

5.3 Bridging

This can be seen live on gitcoin kudos marketplace. Rather than minting on ETH mainnet,

kudos have been shifted to be created on xDai network. This not only creates NFTs with less Gas fee but also saves the environment.
Bridging ETH mainnet to other PoS solutions can also be seen as a temporary solution, which can be adapted quickly as compared to other options.

Artists can mint their NFT on other PoS networks and can transfer their pieces on ETH mainnet only when needed. Using tokenBridge to adapt, can be helpful in the near run.

6. Awareness / Transparency

Green NFT have taken an initiative in this area to aware more artists about this problem. I personally feel that artists care more about the environment than any other community, and making them aware of this problem will definitely produce more interesting solutions.
There are a lot of users who are minting their artworks just for fun to try out this new Technology, hoping somebody might buy their NFTs and they can dip their hands in this Gold Rush. Unknowingly they are also contributing their share in destroying nature.
If the platforms like opensea, rarible, mintable were more transparent about their energy consumptions, we would have seen more genuine artworks and also would have saved some more trees.

7. Ethereum2 roadmap

Eth2 refers to a set of interconnected upgrades that will make Ethereum more scalable, secure and sustainable. This will accommodate 1000s of transactions per second making applications cheaper and faster. Also encouraging to make the Ethereum ecosystem more secure as well as Environment friendly.

To get an overview, this will be done in 3 major steps:

Beacon Chain: This won't change the way we use ethereum today, but lays the groundwork for future upgrades by introducing Proof-Of-Stake to coordinate the network.
This feature was shipped on Dec1 2020, at noon UTC.

Shard Chains: To improve the Scalability and Capacity factor of Ethereum, shard chain will spread the network's load across 64 new chains making it easier to run a node with low hardware requirements.
This feature is estimated to be shipped sometime in the year 2021.

Docking: Merging the current Ethereum mainnet with the beacon chain proof-of-stake system, ending the era of high energy intensive proof-of-work Ethereum.
Expected to follow after Shard Chain (2021/22)

8. Some Notable Carbon Free NFT MarketPlaces

Hic et nunc: This present DApp allows its users to manage decentralised digital assets, serving as a public smart contract infrastructure on Tezos Blockchain. One of the famous marketplace for exchanging NFTs.

Kalamint.io: Another NFT market place backed by Tezos Blockchain. Though Tezos is already based on a proof-of-stake consensus mechanism, Ethereum is considered to be most decentralised after Bitcoin, hence creating an advantage over other cryptocurrencies.

Wax.io: The Worldwide Asset Exchange (WAX) is the world's leading decentralised video game and entertainment network. Developed on their self established Wax blockchain, this platform helps global brands like deadmau5, Atari, Topps, William Shatner, Capcom and more to launch their NFT sales. Atomichub.io is one of the marketplace based on Wax network, primarily contributing in Gaming Collectables.

Epor.io: Eporio is a NFT marketplace which aims to reduce the cost for creators as well as collectors. Eporio uses xDai network which is again based on Proof-of-Stake, hence reducing the energy consumption.

SignArt: This DApp is a web gallery of blockchain-certified digital art. It is built using Waves Protocol, executing instant transactions, with low cost fixed fee. This marketplace require $SIGN utility token for artists to manage their profiles and art pieces. Currencies used to trade are $SIGN, $WAVES, $USDN.

NftyBazaar: Upcoming marketplace compliant to ETh2.0. Will include additional features like cross chain interoperability, cloud storage, royalty on chain, multi-colab, IP protection, EIP 721, EIP 1155 compliant, and more.
Artists can join the waitlist, but this marketplace will follow ETh2.0 development.

NFT-Showroom: Built on Hive Blockchain, uses pegged tokens called SWAP.HIVE to tokenize the art pieces and trade. Currently showcasing Artists with the social Media presence and a portfolio.

Pixeos: Based on EOS blockchain technology. Currently maintains 4 projects:
Art Gallery, Avatar Maker, Paint FE, and Pixeos Hub.
Mesmerising User experience and innovative ways to showcase the gallery.
Pixeos has also developed NFC (Near Field Communication) Artist Kits that will bond digital provenance to physical assets.

9. Author

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